ABSTRACT OF THE DISCLOSURE

The present invention provides nanoshell particles ("nanoshells") for use in biosensing applications, along with their manner of making and methods of using the nanoshells for *in vitro* and *in vivo* detection of chemical and biological analytes, preferably by surface enhanced Raman light scattering. The preferred particles have a non-conducting core and a metal shell surrounding the core. For given core and shell materials, the ratio of the thickness (i.e., radius) of the core to the thickness of the metal shell is determinative of the wavelength of maximum absorbance of the particle. By controlling the relative core and shell thicknesses, biosensing metal nanoshells are fabricated which absorb light at any desired wavelength across the ultraviolet to infrared range of the electromagnetic spectrum. The surface of the particles are capable of inducing an enhanced SERS signal that is characteristic of an analyte of interest. In certain embodiments a biomolecule is conjugated to the metal shell and the SERS signal of a conformational change or a reaction product is detected.